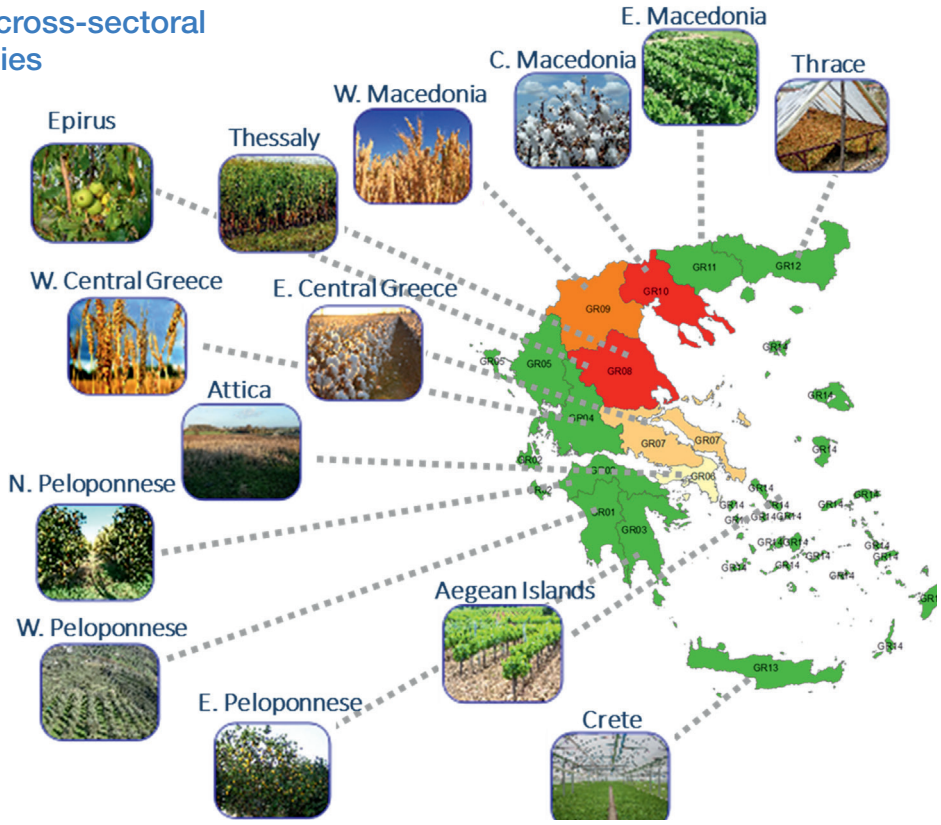
Greece: See the big picture!

The Nexus forces us to think about cross-sectoral implications of single-sector strategies



Key achievements

- Developed a System Dynamics Model that maps sector-specific data from major published databases and scenario models for the national case study of Greece
- Disaggregation algorithms were employed on annual national-scale data and turned them into spatial and temporal datasets by converting them to monthly values spread among all 14 River Basin Districts (RBDs)
- Quantified interlinkages among Water, Energy, Food, Built Environment, Natural Land and greenhouse gas (GHG) emissions on a national and RBD scale
- Policy coherence analysis revealed that policies on climate and food can have positive effects on energy, water and land policies, showcasing the cross-sectoral synergies of Nexus-coherent policy making.

Findings

The Greece Nexus assessment showed that the highest degree of coherence was attained within policies of the same sector. Significant positive policy interactions also exist among policies concerning different Nexus sectors, e.g., climate and energy policies. Climate change adaptation and resilience, combating climate change impacts and sustainable development of agriculture are the most influencing policy objectives.

Finally, Nexus Informatics develops the science of recognising and quantifying Nexus interlinkages. A System Dynamics Model maps sector-specific data, and quantifies interlinkages among water-energy-land-food-climate for Greece. Data availability and scale are core constraints to make the Nexus concept operational. Nexus Directional Chord plots were developed as an innovative visualisation tool, which reveals Nexus hotspots and strong interlinkages among sectors, facilitating stakeholder awareness.

The Nexus is simulated as a holistic multi-sectoral system that provides insights into the vulnerability of resources to future socio-economic scenarios. The analysis shows that to move from a general nexus thinking to an operational nexus concept, it is important to focus on data availability and scale. Nexus Directional Chord plots are developed as an innovative visualisation tool, which reveals Nexus hotspots and strong interlinkages among sectors, facilitating stakeholder awareness.

Key outputs

Laspidou C., N. Mellios & D. Kofinas (2019) Towards Ranking the Water–Energy–Food–Land Use–Climate Nexus Interlinkages for Building a Nexus Conceptual Model with a Heuristic Algorithm. Water, 11, (2), 306; Munaretto et al., 2018).

Laspidou C., N. Mellios, A. Spyropoulou, D. Kofinas & M.P. Papadopoulou (2020) Systems thinking on the resource Nexus: Modeling and visualisation tools to identify critical interlinkages for resilient and sustainable societies and institutions. Science of Total Environment, Vol. 717, 137264,

Papadopoulou C.A, M.P. Papadopoulou, C. Laspidou, S. Munaretto & F. Brouwer (2020) Towards a Low-Carbon Economy: A Nexus-Oriented Policy Coherence Analysis in Greece. Sustainability, Vol. 12, Issue 1,

Serious Game for Greece, both at national scale and at RBD scale

Dataset: Mellios, N.; Laspidou, C. (2020), "Water-Energy-Food-Land-Climate Nexus data for the Case Study of Greece: National and River Basin District Scale", Mendeley Data,

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SIM4NEXUS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 689150 SIM4NEXUS